

1 What is claimed is:

2 1. A color imaging system comprising:

3 a color imager having a plurality of photocells producing electrical responses that  
4 correspond to chromatic intensity values, and the electrical responses from the plurality of  
5 photocells together comprising a captured color image; and

6 an image processor that determines whether the captured image is substantially  
7 achromatic, and if so, renders each of the electrical responses as an achromatic luminance value.

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9 2. The color imaging system of claim 1, wherein the image processor further white-  
10 balances the substantially achromatic image.

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12 3. The color imaging system of claim 1, wherein the image processor automatically  
13 white-balances the substantially achromatic image.

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15 4. The color imaging system of claim 1, wherein the substantially achromatic image  
16 is a gray-scale image, and the achromatic format is a gray-scale format.

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18 5. The color imaging system of claim 1, wherein the substantially achromatic image  
19 is a black-and-white image, and the achromatic format is a black-and-white format.

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21 6. The color imaging system of claim 1, wherein the color image capture device is a  
22 scanner having a constant, known light source.

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1           7.     The color imaging system of claim 1, wherein the color image capture device and  
2 image processing circuitry are disposed within a single device.

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4           8.     The color imaging system of claim 1, further comprising a switch that allows a  
5 user to select from among a plurality of white-balance settings.

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7           9.     The color imaging system of claim 1, further comprising an image-type  
8 specification control that allows a user to select from among a plurality of image formats that  
9 determine how the achromatic image is rendered.

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11          10.    An image processor that processes an image comprising a plurality of chromatic  
12 intensity values, comprising:

13           a white balance circuit that modifies the chromatic intensity values to compensate for  
14 imperfect sources of illumination that lack an equal and continuous mixture of the visible  
15 frequencies of light;

16           an achromatic image-detection circuit that detects whether the image is substantially  
17 achromatic; and

18           an image conversion circuit that renders each chromatic intensity value as an achromatic  
19 luminance value if the achromatic image detection circuit detects that the image is substantially  
20 achromatic.

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22          11.    The image processor of claim 10, wherein the white balance circuit evaluates a  
23 prior image to compute a set of values with which to modify the primary color intensity values.

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2           12.     The image processor of claim 10, wherein the white balance circuit evaluates the  
3 image to compute a set of values with which to modify the chromatic intensity values of the  
4 image.

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6           13.     The image processor of claim 10, further comprising a color imager that captures  
7 the image.

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9           14.     The image processor of claim 10, wherein the achromatic image-detection circuit  
10 detects whether the image is a substantially black-and-white image, and the image conversion  
11 circuit renders the plurality of chromatic intensity values as black and white values if the  
12 achromatic image detection circuit detects that the image is a substantially black-and-white  
13 image.

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15           15.     The image processor of claim 14, wherein the image conversion circuit converts  
16 each achromatic luminance value that is less than a threshold value to black and converts each  
17 achromatic luminance value that is more than the threshold value to white.

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19           16.     A method of processing an image that is captured as a plurality of chromatic  
20 intensity values, comprising:  
21           determining whether the plurality of chromatic intensity values comprises a substantially  
22 achromatic image; and

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1 converting the plurality of chromatic luminance values to a plurality of achromatic  
2 luminance values if the plurality of chromatic luminance values are determined to comprise a  
3 substantially achromatic image.  
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5 17. The method of claim 16, further comprising capturing the image with a color  
6 imager having a plurality of photocells producing electrical responses corresponding to the  
7 plurality of chromatic intensity values.  
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9 18. The method of claim 16, further comprising detecting whether the image is a  
10 substantially black-and-white image, and if the image is detected to be a substantially black-and-  
11 white image, converting the plurality of chromatic luminance values to a plurality of black and  
12 white values.  
13

14 19. The method of claim 16, further comprising the steps of computing mean and  
15 standard deviation values of a color saturation distribution of the image, and comparing the mean  
16 and standard deviation values to a plurality of threshold values to detect whether the image is  
17 substantially achromatic.  
18

19 20. The method of claim 16, further comprising the steps of computing mean and  
20 standard deviation values of a luminance distribution of the image, and comparing the mean and  
21 standard deviation values to a plurality of threshold values to detect whether the image is a  
22 substantially black and white image.  
23

1           21.     A color imaging system comprising:  
2           means for capturing an image as a plurality of chromatic intensity values; and  
3           means for detecting whether the captured image is substantially achromatic, and if so,  
4           rendering each of the chromatic intensity values as achromatic luminance values.

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6           22.     An image processor that processes an image comprising a plurality of chromatic  
7           intensity values, comprising:

8           means for compensating the image for sources of illumination that lack an equal and  
9           continuous mixture of visible frequencies of light;

10          means for detecting whether the image, after it has been modified by the compensating  
11          means, is substantially achromatic; and

12          if so, means responsive to the detection means for rendering each chromatic intensity  
13          value as an achromatic luminance value.

14  
15          23.     A system for processing an image that is captured as a plurality of chromatic  
16           intensity values, comprising:

17           means for determining whether the plurality of chromatic intensity values comprises a  
18           substantially achromatic image; and

19           means for converting the plurality of chromatic intensity values to a plurality of  
20           achromatic luminance values if the plurality of luminance values are determined to comprise a  
21           substantially achromatic image.